Published in final edited form as:

Foot (Edinb). 2015 March ; 25(1): 19–29. doi:10.1016/j.foot.2014.12.001.

Evaluating a standardised tool to explore the nature and extent of foot and ankle injuries in amateur and semi-professional footballers

S. Evans, BS, BM¹, K. Walker-Bone, BM MRCP PhD¹, and S. Otter, BSc(Hons) MSc PhD FCPodMed²

¹Brighton & Sussex Medical School, Brighton, United Kingdom

²School of Health Professions, University of Brighton UK

Abstract

Introduction—Football is a popular sport amongst amateurs as well as professionals. To date, most studies of football injuries have included only professional players and data have been collected in a variety of different ways. There is currently no single validated, standardised tool for the assessment of injuries. Therefore, we developed a standardised questionnaire based upon an instrument used in rheumatoid arthritis sufferers and used it in a group of semi-professional and amateur footballers. We quantified the prevalence of foot/ankle injuries and evaluated risk factors for these injuries.

Method—A trained recorder administered a 33-item questionnaire (recording quantitative and qualitative data) in three football teams, 1 amateur and 2 semi-professional. The questionnaire enquired about demography, football specific information such as footwear and orthoses, and nature & extent of injuries.

Results—42/42 eligible footballers completed the questionnaire. 34/42 respondents (81%) reported that they had experienced a total of 273 football-related injuries, 114 of which occurred at the foot or ankle. 70 injuries occurred at the ankle and 44 at the foot and 44% of the footballers had suffered one or more foot/ankle injuries in the past 12 months. Statistically significant relationships were seen between occurrence of lower limb and foot/ankle injuries and age, ($p=0.03$) weight ($p=0.01$) height ($p=0.01$) and shorter duration of warm-up (p).

Conclusion—The standardised tool performed well with an excellent response rate. Foot and ankle injuries were common in semi-professional and amateur footballers. Amongst this relatively small sample, statistically significant risk factors were identified which may be potential targets for prevention strategies but larger studies will be required.

Introduction

Association football or Soccer is one of the most popular sports worldwide, with 4% of the world's population actively involved and represents one of the UK's most popular sports alongside athletics and cycling. (Sport England 2008). In England, football-related injuries

are second only to rugby league in terms of prevalence, and for professional footballers, the levels of injury are approximately 1000 times greater than for industrial occupations generally regarded as high risk e.g. construction. (Hawkins & Fuller 1999). There is an estimated frequency of 10-35 injuries per 1000 player-hours and a performance-limiting injury occurs every 0.8-2 matches. (Giza et al 2003). Approximately 86% of football injuries occur in the lower extremity, with the ankle and foot accounting for between 11-17% and 5-6% of injuries respectively (Hawkins & Fuller 1999, Hawkins et al. 2001). In particular, foot injuries to high profile players in the Premier league have been widely reported in the Press (Winter 2002, Fenton et al. 2006, Jacob 2009), with these injuries often keeping key players out of league and International competition for several weeks.

A wide range of factors have been considered when studying foot and ankle injury mechanism in footballers (figure 1). However, epidemiology is often poorly reported with little standardisation of methodology, differing definitions of what constituted an injury, (Inkelaar 1994); lack of consistency in demographic data collected, the role of psychological factors, football specific information (such as type of boots worn), and small numbers of participants. Moreover, most studies have been carried out with professional football clubs, yet semi-professional and amateur players make up the vast majority of those playing football at a competitive level. We aimed to quantify the prevalence of foot and ankle injuries in amateur and semi-professional footballers and subsequently determine possible risk factors from which simple evidence-based prevention initiatives could be recommended as clubs may not have the sophisticated medical facilities available to larger professional organisations.

Methods

Questionnaire development

A literature search revealed no papers that included a questionnaire of suitable sensitivity & specificity that could be used for this study. The Union of European Football Associations (UEFA) have developed a model to which epidemiological studies on football injuries should be based (Hagglund et al. 2005) and was considered, but this suggests a classification approach whereby the severity of an injury is determined by the length of absence from playing. This approach requires considerable recall accuracy or access to accurate club medical records and was not felt to be appropriate for a retrospective study, particularly when more than one injury was being considered. In light of this, a new questionnaire was developed by generating items from footballers, both professional and amateur as well as a range of health professionals (rheumatologists, physiotherapists and podiatrists). Items generated were then triangulated with the literature. We tested the questionnaire in three stages, firstly an amateur football team completed the questionnaire, commented on ease of understanding and areas they felt were missing. Following minor modifications to the format questionnaires were then distributed to semi-professional footballers and returned to health professionals for their input. The final questionnaire (appendix 1) enquired about demographic data, football specific data (position played, type of football boots etc.); general information about type and number of injuries as well as specific data regarding foot or ankle injuries and overall mood.

Subjects and setting

A range of amateur and semi-professional teams were identified locally and invited to participate. The teams consisted of an amateur team and two semi-professional teams playing in the UK Blue Square Premier Division. A convenience sample of male footballers currently in the first-team squad for three teams in the South-East of England was selected. Ethical approval was granted from Brighton and Sussex Medical School Research Governance and Ethics Committee.

Data collection

The method of distribution of questionnaires varied between teams but suited each individual team in order to maximise the response rate. One team were given the questionnaires on a coach journey to an away match, whereas the other two teams completed the questionnaires either at the beginning or end of training sessions with the help of the teams' physiotherapist. Each team member (total $n=42$) received a covering letter, questionnaire and consent form the latter two being returned to the researcher in a pre-paid reply envelope. To further enhance credibility and any reduce recall bias it was proposed that the footballers' medical records were examined and used to identify whether there was concurrence between the records and the player's recall of his injuries. However, not all clubs kept records and of those that did the records revealed a consistent lack of information regarding injuries in general, therefore this approach was abandoned.

Statistical Analysis

Data were cleaned and entered into SPSS v16.0. Categorical data were summarised using frequency counts and percentages. Continuous data were summarised by means ($\pm$ standard deviations). The student's t test, analysis of variance, Chi square and Correlation coefficients were used to test for significant associations between injuries and possible causative factors, with significance set at the $p<0.05\%$ confidence level.

Results

Demographic data

In total 34 useable questionnaires were returned (81% response rate), and across the three teams, 2 goalkeepers, 14 defenders, 15 midfielders and 3 strikers completed the questionnaire. The mean age of respondents was 24 years (SD 4.9), with a mean 11.21 years of playing experience (range 2-23 years SD 5.6). Mean weight was 77.66kg (SD 8.4) and height 179.34cms (SD 8.1); mean BMI 24.12 (SD 1.5). There was no significant difference between the two semi-professional teams for anthropometric data (age, height, weight, BMI) or number of years of club football played. There was a difference between the amateur and semi-professional players, with amateur footballers being significantly shorter ($p=0.010$) and lighter ($p=0.051$) than semi-professional players. Only 9% ($n=3$) stated that they either currently smoked or had smoked in the past and 67% ($n=23$) of all the footballers said that they drank alcohol, but the self-reported amount was below the recommended 21 units/week in all but 2 cases.

Epidemiology of injuries

In total of 273 injuries were reported and 114 of these were foot or ankle injuries (42%). All of the 34 subjects studied had experienced at least one injury during their career. Across the three teams, the two semi-professional teams had accumulated the highest overall number of injuries (140 and 85), with 48 in the amateur team. The mean number of injuries per player for each team was 14, 7 and 4 respectively. Overall, midfielders had the highest average number of injuries with 10.5 followed closely by goalkeepers (9.5) and defenders (8.6). Strikers had a lower mean number of injuries with 4.7 per player.

Foot and ankle injuries

In the lower limb, the ankle was the most commonly injured site with 26% ($n=70$) of the total recorded injuries. Foot injuries were the second most common with 16% ($n=44$), followed closely by thigh (14%), knee (12%) and groin (12%) injuries (figure 2). The ankle was the most commonly injured site for both semi-professional teams; the foot (31%) was the most common site for the amateur team (the ankle accounting for 29%). Chi-squared testing showed that the players who had suffered more than or equal to five injuries, were significantly older ($p=0.03$), heavier ($p=0.01$) and taller ($p=0.004$) than those with less than five injuries. (injury any site or foot/ankle?)

In the past twelve months, just under half of respondents (44%), reported that they had suffered a foot or ankle injury. The amateur team reported a much higher overall percentage of foot and ankle injuries (64%) than either of the semi-professional teams (40% and 31%). Of the foot/ankle injuries sustained in the last 12 months, most (80%) of injuries occurred whilst playing in a match. There was no significant relationship between the position played and suffering a foot or ankle injury ($p=0.523$).

Match preparation

There was a significant relationship ($p=0.05$) between the length of warm-up and foot/ankle injuries in the past 12 months with those players who warmed-up for less than 15 minutes suffering a greater number of injuries. In terms of amount of time spend warming-up for training/match, the most frequent length of warm-up overall was between 15-29 minutes. Only four players warmed-up for less than 15 minutes and all belonged to the amateur team. Overall, 50% of semi-professional players warmed up for between 15-29 minutes the remainder warmed up for 30-44 minutes. No players warmed up for more than 45 minutes.

Role of boots, insoles & supports

Most of the footballers studied solely wore studded football boots (79%) with only 5 players (15%) exclusively wearing bladed boots. The brand of boot varied between teams with Nike and Adidas being the most common, however some players interchanged between brands making it difficult to draw firm conclusions. In total 44% ($n=15$) of the footballers reported that they currently wore football boot insoles. There was no significant relationship found between wearing boot insoles and a foot or ankle injury in the past 12 months ($p=0.260$). Overall 9 players (26%) reported currently wearing ankle supports/tape. No significant relationship was found either between the use of ankle supports and suffering a foot/ankle injury ($p=0.420$), or between the type of ankle support worn (brace or tape) and the risk of

this injury occurring ($p=0.956$). Interestingly 5 of the 9 players who wore ankle supports experienced a recent foot or ankle injury, whereas 10 of the 25 footballers that did not wear ankle supports suffered a similar injury.

Discussion

This study aimed to quantify the extent of foot and ankle injuries in footballers and identify the risk factors for these injuries. The ankle was the most commonly injured site with 26% ($n=70$) of the total recorded injuries and foot injuries the second most common with 16% ($n=44$). Our findings were noticeably different from previous studies in which ankle injuries accounted for only 11-17% of injuries and foot injuries between 5-6%; although similar prevalence rates were reported in young female footballers (LeGrall 2008). These differences may be because previous work has focussed more on subjects playing in professional leagues, where more work may be focussed on injury prevention. The contention here is that if the proportion of participants in elite and semi-professional/amateur leagues are compared, there are far greater numbers of people competing at lower levels and the number of injuries and therefore potential impact on need for healthcare provision is considerably greater. Equally, there are opportunities for a range of health professionals to provide advice on mechanisms for injury prevention.

As indicated in the results, significant relationships were found between several factors and the likelihood of suffering a foot or ankle injury. In particular, footballers were significantly more likely to suffer a foot or ankle injury during a match rather than in a training session. This might be expected given the nature of competitive play and has been supported in the literature by Hawkins et al. **Error! Bookmark not defined.** and Chomiak et al. **Error! Bookmark not defined.** Moreover, the finding that more injuries occur during matches can be used to highlight the vicious circle of injuries outlined in Figure 3. To escape this cycle, a suitable prevention programme is required aimed at preventing injuries from occurring in the first place.

Players were found to be significantly more likely to injure the foot or ankle if subjects reported they warmed-up for less than 15 minutes. It was outside the remit of this pilot work, but future studies may wish to consider what warm-up techniques are used by players, particularly in light of recent reviews (Fradkin et al 2006, Small et al 2008, Fradkin et al 2009) that indicate particular types of warm-up exercise may not reduce incidence of injuries. This area is difficult to draw firm conclusions on however. For example, Solingrad et al (2008) using a cluster randomised controlled trial reported that a structured warm-up programme could reduce injury risk in younger female players. However, others (Engelbresten et al 2008) using a similar methodology found player compliance with training programmes designed to reduce injury risk was poor. These factors are particularly important in light of the finding that players who are older, heavier and taller were significantly more likely to have suffered more injuries, findings which support previous work (Arnason et al. **Error! Bookmark not defined.** and Faude et al.21). This is not an unexpected finding as one would expect older players to have played for longer and thus have accumulated more injuries. Possible explanations for the effect of height and weight on injuries may include the position preference of players. Others have shown (Kofotolis N,

Kellis 2007) that defenders have a significantly increased injury risk as defenders are typically tall and this may predispose to injuries

Foot orthoses have been shown to be effective at pain reduction in a range of foot and lower limb complaints (Hawke 2009, Lee 2009, Hume 2008, Stefanyshyn 2006) but their role in injury prevention is less well understood. Although in military recruits, foot orthoses appeared to reduce the incidence of posterior tibial stress syndrome and stress fractures (Larsen 2002, Firestein 1999), these findings cannot be generalised to the wider athletic population. Moreover, reviews have indicated that studies often did not control for key confounding factors (e.g. type of orthotic, injury specific characteristics, impact of footwear and so on Hume 2008, Stefanyshyn 2006).

In the current study there was no significant relationship between the use of ankle supports and the risk of injury. Foot and ankle injuries were reported in almost equal numbers regardless of whether players taped/braced their ankles or not. Taping of the ankle is often thought of as the mainstay of ankle injury prevention, particularly in the USA and has been shown to be as effective as using ankle braces (Michel et al. 2006). However, taping is reported to be considerably more expensive than reusable ankle braces (Lomstead et al. 2004, Michel et al. 2006). Additionally, Lohkamp and colleagues (2006) have suggested that exposure to football specific activity rapidly negates any beneficial effect of taping. The combination of these factors may make the routine use of ankle protection beyond the means of some players/clubs. Interestingly, alternative approaches to taping (e.g. balance training) has been suggested as an effective method of preventing ankle sprains in adolescent American football players^f; particularly in those with a higher BMI and/or previous ankle injury, which were two key findings in our study. If appropriately qualified staff can provide such training this may represent a more effective approach to reducing the injury burden for amateur clubs.

Our findings need to be considered alongside a number of limitations. This was a relatively small population that considered three football teams, while there is no reason to suspect these teams are not typical of amateur and semi-professional footballers a larger sample frame should be considered. Equally it is impossible to exclude the possibility of a responder bias (i.e. those subjects who experienced an injury were more likely to respond to this survey), however there was considerable consistency in our findings particularly considering this was a new questionnaire-based approach for researching injuries in footballers. Future work should consider investigate factors that are more difficult to examine in a retrospective study, such as playing surface and the timing of injury within a match.

In conclusion, foot and ankle injuries in amateur and semi-professional footballers were much more prevalent than the literature suggests. The use of simple methods of injury prevention (e.g. ankle supports) does not appear to be particularly effective. Health professionals may wish to develop a closer working relationship to reduce the frequency of injuries, thus achieve overall improvements in health by increasing players' ability to participate in the chosen sport.

^f although it should be noted that American Football unlike soccer is a full contact sport.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

References

- Sport England [Online]. [Accessed 2009 Mar 31] 2008. Available from URL: http://www.sportengland.org/index/news_and_media/news_pr/more_people_playing_sport.htm
- Smith SJL. Sports injuries are badly managed in Britain. *BMJ*. 1996 Jun; 312(7045):1499–1500. [PubMed: 8646134]
- Hawkins RD, Fuller CW. A prospective epidemiological study of injuries in four English professional football clubs. *Br J Sports Med*. 1999 Jun; 33(3):196–203. [PubMed: 10378073]
- Giza E, Fuller C, Junge A, Dvorak J. Mechanisms of foot and ankle injuries in soccer. *Am J Sports Med*. 2003 Jul; 31(4):550–554. [PubMed: 12860543]
- Hawkins RD, Fuller CW. A prospective epidemiological study of injuries in four English professional football clubs. *Br J Sports Med*. 1999 Jun; 33(3):196–203. [PubMed: 10378073]
- Hawkins RD, Hulse MA, Wilkinson C, Hodson A, Gibson M. The association football medical research programme: an audit of injuries in professional football. *Br J Sports Med*. 2001 Feb; 35(1): 43–47. [PubMed: 11157461]
- Inklaar H. Soccer Injuries. I: Incidence and severity. *Sports Med*. 1994 Jul; 18(1):55–73. [PubMed: 7939040]
- Häggglund M, Waldén M, Bahr R, Ekstrand J. Methods for epidemiological study of injuries to professional football players: developing the UEFA model. *Br J Sports Med*. 2005 Jun; 39(6):340–346. [PubMed: 15911603]
- Harrison, David. Newspapers. *Sunday Telegraph*; London, England: Apr 30. 2006 Rooney a World Cup doubt after foot injury. [Web. 15 Dec. 2009]
- Newspapers. *Times*; London, England: Apr 10. 2009 Desperation fades as Defoe's gaze fixes on life back in the limelight; England striker tells Gary Jacob that countdown has begun towards his return from broken foot; p. 81 http://find.galegroup.com/gtx/start.do?prodId=SPN.SP01&userGroupName=brighton_itw [Web. 15 Dec. 2009]
- Winter, Henry. Newspapers. *Daily Telegraph*; London, England: Apr 15. 2002 Injuries add to England's pain; p. 3 [Web. 15 Dec. 2009]

Intrinsic

- Age
- Sex
- Height
- Weight
- BMI
- Dominant limb
- Previous injury
- Psychological Factors
- Medical Conditions
- Family History Of Medical Conditions

Extrinsic

- Position played
- Wide or central player
- Type of football boot worn
- Brand of football boot
- Frequency of football boot change
- Ankle supports worn
- Use of boot insoles
- Training or match play
- Warm-up time
- Footballing experience
- Smoking history
- Alcohol intake
- Dietary Supplements

Figure 1.

Figure 2.

Figure 3.